2 B

instruction manual

Beckman®

Berkeley Division

MP MASTER

MA31724

BECKMAN/BERKELEY

MODEL 5924-4

IN-LINE READOUT

J.O. _____

SERIAL _____

BECKMAN Instruments Inc.
Berkeley Division

Richmond 3, California
9 January, 1962

BECKMAN/BERKELEY

MODEL 5924-4

IN-LINE READOUT

The BECKMAN/Berkeley Model 5924-4 is a standard BECKMAN/Berkeley Model 5920, In-Line Readout, which has been modified as follows:

1. "R" and "T" modifications have been installed as shown in the MODIFICATIONS section of the standard 5920 instruction manual.

2. Input plug has been relocated on rear panel.

   Cannon DPX Latch Assembly to mate with Cannon Hood, DPX 22017, are installed on plug per customer requirements.

3. Chassis and top cover have been ventilated per customer requirement.

In all other respects this instrument is standard and the following instruction manual will apply.

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0001		20	325-401868	BAR KNOB, BLACK BAKELITE, 1-1/8 IN.	BECKMAN	325-401868	1	0	.50	
0002		20	330-807651	FERRULE, HANDLE, CHROME PLATED	USECO	900	4	0	.20	
0003		20	330-807665	HANDLE, CHROME PLATED, 2.187 LG.	ALAC	825	2	0	1.20	
0004	R305	20	601-000565	RESISTOR, FIXED, COMP, 22K, 1/2W, 5%	ALLEN BRD	EB2235	6	2	.20	.20
0005	R309			SAME AS ITEM 0004						
0006	R317			" " " "						
0007	R401			" " " "						
0008	R402			" " " "						
0009	R403			" " " "						
0010	R103	20	601-000899	RESISTOR, FIXED, COMP, 4.7K, 1/2W, 5%	ALLEN BRD	EB4725	45	4	.20	.80
0011	R109			SAME AS ITEM 0010						
0012	R115			" " " "						
0013	R121			" " " "						
0014	R197			" " " "						
0015	R413	20	601-010942	RESISTOR, FIXED, COMP, 6.8K, 1/2W, 5%	ALLEN BRD	EB6825	27	4	.20	.80
0016	R414			SAME AS ITEM 0015						
0017	R415			" " " "						
0018	R416			" " " "						
0019	R417			" " " "						
0020	R418			" " " "						
0021	R419			" " " "						
0022	R421			" " " "						
0023	R422			" " " "						
0024	R423			" " " "						
0025	R424			" " " "						

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT MODEL 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0026	R425			SAME AS ITEM 0015						
0027	R426			" " " "						
0028	R427			" " " "						
0029	R429			" " " "						
0030	R430			" " " "						
0031	R431			" " " "						
0032	R432			" " " "						
0033	R433			" " " "						
0034	R435			" " " "						
0035	R436			" " " "						
0036	R437			" " " "						
0037	R438			" " " "						
0038	R439			" " " "						
0039	R440			" " " "						
0040	R441			" " " "						
0041	R320			" " " "						
0042	R448	20	601-015038	RESISTOR, FIXED, COMP, 1K, 1/2W, 5%	ALLEN BRD	EB1025	19	4	.20	.80
0043	R449			SAME AS ITEM 0042						
0044	R450			" " " "						
0045	R451			" " " "						
0046	R452			" " " "						
0047	R453			" " " "						
0048	R454			" " " "						
0049	R301			" " " "						
0050	R302			" " " "						

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0051	R316			SAME AS ITEM 0042						
0052	R319			" " " "						
0053	R104	20	601-015044	RESISTOR, FIXED, COMP, 8.2K, 1/2W, 5%	ALLEN BRD	EB8225	37	4	.20	.80
0054	R110			SAME AS ITEM 0053						
0055	R116			" " " "						
0056	R124			" " " "						
0057	R303			" " " "						
0058	R304	20	601-015047	RESISTOR, FIXED, COMP, 3.9K, 1/2W, 5%	ALLEN BRD	EB3925	30	4	.20	.80
0059	R308			SAME AS ITEM 0058						
0060	R310	20	601-015050	RESISTOR, FIXED, COMP, 5.6K, 1/2W, 5%	ALLEN BRD	EB5625	5	2	.20	.40
0061	R412			SAME AS ITEM 0060						
0062	R420			" " " "						
0063	R428			" " " "						
0064	R434			" " " "						
0065	R190	20	601-015052	RESISTOR, FIXED, COMP, 10K, 1/2W, 5%	ALLEN BRD	EB1035	51	4	.20	.80
0066	R191			SAME AS ITEM 0065						
0067	R192			" " " "						
0068	R193			" " " "						
0069	R194			" " " "						
0070	R195			" " " "						
0071	R196			" " " "						
0072	R306			" " " "						
0073	R307			" " " "						
0074	R314			" " " "						
0075	R318			" " " "						

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0076	R322	20	601-015056	RESISTOR, FIXED, COMP, 18K, 1/2W, 5%	ALLEN BRD	EB1835	1	1	.20	.20
0077	R311	20	601-015058	RESISTOR, FIXED, COMP, 27K, 1/2W, 5%	ALLEN BRD	EB2735	2	1	.20	.20
0078	R312			SAME AS ITEM 0077						
0079	R169	20	601-015074	RESISTOR, FIXED, COMP, 100K, 1/2W, 5%	ALLEN BRD	EB1045	16	4	.20	.80
0080	R170			SAME AS ITEM 0079						
0081	R171			" " " "						
0082	R172			" " " "						
0083	R173			" " " "						
0084	R174			" " " "						
0085	R175			" " " "						
0086	R176			" " " "						
0087	R177			" " " "						
0088	R178			" " " "						
0089	R179			" " " "						
0090	R180			" " " "						
0091	R181			" " " "						
0092	R182			" " " "						
0093	R183			" " " "						
0094	R198			" " " "						
0095	R106	20	601-015446	RESISTOR, FIXED, COMP, 470 OHM, 1/2W, 5%	ALLEN BRD	EB4715	4	2	.20	.40
0096	R112			SAME AS ITEM 0095						
0097	R118			" " " "						
0098	R123			" " " "						
0099	R412	20	601-015447	RESISTOR, FIXED, COMP, 680 OHM, 1/2W, 5%	ALLEN BRD	EB6815	1	1	.20	.20
0100	R408	20	601-022946	RESISTOR, FIXED, COMP, 10 OHM, 1/2W, 5%	ALLEN BRD	EB1005	1	1	.20	.20

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0101	R315	20	601-022948	RESISTOR, FIXED, COMP, 15K, 1/2W, 5%	ALLEN BRD	EB1535	1	1	.20	.20
0102	R102	20	601-029323	RESISTOR, FIXED, COMP, 12K, 1/2W, 5%	ALLEN BRD	EB1235	41	4	.20	.80
0103	R108			SAME AS ITEM 0102						
0104	R114			" " " "						
0105	R120			" " " "						
0106	R404			" " " "						
0107	R405			" " " "						
0108	R406			" " " "						
0109	R407			" " " "						
0110	R408			" " " "						
0111	R409			" " " "						
0112	R410			" " " "						
0113	R411			" " " "						
0114	R321			" " " "						
0115	R313	20	601-041151	RESISTOR, FIXED, COMP, 1M, 1/2W, 5%	ALLEN BRD	EB1055	2	1	.20	.20
0116	R323			SAME AS ITEM 0115						
0117	R105	20	601-800055	RESISTOR, FIXED, COMP, 470 OHMS, 1W, 5%	ALLEN BRD	GB4715	4	2	.30	.60
0118	R111			SAME AS ITEM 0117						
0119	R117			" " " "						
0120	R122			" " " "						
0121	R411	20	601-000893	RESISTOR, COMP, 56 OHMS, 1/2W, 5%	ALLEN BRD	EB5605	1	1	.25	.25
0122	C403	20	631-023348	CAPACITOR, FIXED, ELECTROLYTIC, 25 MFD, 200V	SPRAGUE	TVA-1207	1	1	.60	.60
0123	C308	20	631-802885	CAPACITOR, FIXED, ELECTROLYTIC, 5 MFD, 25V	SPRAGUE	TE-1202	2	1	.60	.60
0124	C309			SAME AS ITEM 0123						
0125	C404	20	631-802918	CAPACITOR, FIXED, ELECTROLYTIC, 25 MFD, 250V	SANGAMO	MTH-2525	1	1	.80	.80

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0126	C401	20	631-802934	CAPACITOR, FIXED, ELECTROLYTIC, 2500 MFD, 25V	MALLORY	TYPE WP	2	1	2.20	2.20
0127	C402			SAME AS ITEM 0126						
0128	C301	20	631-815261	CAPACITOR, FIXED, ELECTROLYTIC, 1 MFD, 50V	SPRAGUE	30D189A1	1	1	.70	.70
0129	C101	20	633-804706	CAPACITOR, FIXED, CERAMIC, 1000 MMFD, 600V	CENTRALAB	DD-102	4	1	.20	.20
0130	C103			SAME AS ITEM 0129						
0131	C105			" " " "						
0132	C107			" " " "						
0133	C302	20	633-804710	CAPACITOR, FIXED, CERAMIC, 2200 MMF, 600V	ERIE	811-.0022	62	2	.20	.40
0134	C303			SAME AS ITEM 0133						
0135	C304			" " " "						
0136	C305			" " " "						
0137	C306			" " " "						
0138	C312			" " " "						
0139	C117	20	633-804714	CAPACITOR, FIXED, CERAMIC, 5000 MMF, 1000V	CENTRALAB	DD-5022	41	2	.20	.40
0140	C118			SAME AS ITEM 0139						
0141	C119			" " " "						
0142	C120			" " " "						
0143	C121			" " " "						
0144	C122			" " " "						
0145	C123			" " " "						
0146	C124			" " " "						
0147	C125			" " " "						
0148	C126			" " " "						
0149	C127			" " " "						
0150	C128			" " " "						

SPARE PARTS LIST

RECOMMENDED SPARES FOR
2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0151	C129			SAME AS ITEM 0139						
0152	C130			" " " "						
0153	C131			" " " "						
0154	C132			" " " "						
0155	C142			" " " "						
0156	C143			" " " "						
0157	C144			" " " "						
0158	C145			" " " "						
0159	C146			" " " "						
0160	C147			" " " "						
0161	C148			" " " "						
0162	C307			" " " "						
0163	C311			" " " "						
0164	C133	20	639-006773	CAPACITOR, FIXED, PAPER, 1 MFD, 200 VDC	HOPKINS	1P2D	1	1	1.00	1.00
0165	C313	20	639-007467	CAPACITOR, FIXED, PAPER, .1MFD, 400V, 20%	HOPKINS	P14D	1	1	.70	.70
0166	C102	20	639-807586	CAPACITOR, FIXED, PAPER, .06 MFD, 200V	HOPKINS	P062D	8	3	.70	2.10
0167	C104			SAME AS ITEM 0166						
0168	C106			" " " "						
0169	C108			" " " "						
0170		20	664-401909	CORDSET, ELECT. POWER, 3 COND, BLK, 7 FT.	BECKMAN	664-401909	1	0	1.25	
0171	P101	20	672-806831	CONNECTOR, PLUG, MALE, 40 PINS	CANNON	DPX-40-33P	1	1	4.50	4.50
0172			SPECIAL	LATCH ASSEMBLY, DPX CONNECTOR	CANNON	022-52-0000	2	2	1.30	2.60
0173	S401	20	711-403545	SWITCH, ROTARY, 2 SEC, 4 POSITIONS	BECKMAN	711-403545	1	1	2.60	2.60
0174	F401	20	731-000148	FUSE, ELECTRICAL, 1 AMP, 250V, TIME DELAY	LITTLEFUSE	313001	2	10	.40	4.00
0175	F402			SAME AS ITEM 0174						

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0176	XF401	20	735-017796	FUSEHOLDER, 15 AMP AT 250V	LITTLEFUSE	342004	2	0	.50	
0177	XF402			SAME AS ITEM 0176						
0178	CR405	20	755-001299	DIODE, CRYSTAL RECTIFYING, TYPE 1N91	GEN ELECT	1N91	2	6	.90	5.40
0179	CR406			SAME AS ITEM 0178						
0180	Q101	20	755-402781	TRANSISTOR, SPECIAL	BECKMAN	755-402781	86	39	.70	27.30
0181	Q102			SAME AS ITEM 0180						
0182	Q103			" " " "						
0183	Q104			" " " "						
0184	Q105			" " " "						
0185	Q106			" " " "						
0186	Q107			" " " "						
0187	Q108			" " " "						
0188	Q301			" " " "						
0189	Q302			" " " "						
0190	Q303.			" " " "						
0191	Q304			" " " "						
0192	Q305			" " " "						
0193	Q306			" " " "						
0194	CR109	20	755-404593	DIODE, SPECIAL	BECKMAN	755-404593	19	16	.80	12.80
0195	CR110			SAME AS ITEM 0194						
0196	CR111			" " " "						
0197	CR112			" " " "						
0198	CR113			" " " "						
0199	CR114			" " " "						
0200	CR115			" " " "						

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0201	CR116			SAME AS ITEM 0194						
0202	CR118			" " " "						
0203	CR119			" " " "						
0204	CR120			" " " "						
0205	CR121			" " " "						
0206	CR122			" " " "						
0207	CR123			" " " "						
0208	CR124			" " " "						
0209	CR125			" " " "						
0210	CR301			" " " "						
0211	CR302			" " " "						
0212	CR307			" " " "						
0213	CR140	20	755-800272	DIODE, CRYSTAL RECTIFYING, TYPE 1N95	HUGHES	1N95	33	21	.65	13.60
0214	CR303			SAME AS ITEM 0213						
0215	CR304			" " " "						
0216	CR305			" " " "						
0217	CR306			" " " "						
0218	CR401	20	755-800274	DIODE, CRYSTAL RECTIFYING, TYPE 1N198	HUGHES	1N198	7	12	2.00	24.00
0219	CR402			SAME AS ITEM 0218						
0220	CR403			" " " "						
0221	CR404			" " " "						
0222	CR405			" " " "						
0223	CR406			" " " "						
0224	CR407			" " " "						
0225	Q401	20	755-811276	TRANSISTOR, TYPE 2N1374	TEXAS INST	2N1374	11	14	.90	12.60

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS. OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
0226	Q402			SAME AS ITEM 0225						
0227	Q403			" " " "						
0228	Q404			" " " "						
0229	Q405			" " " "						
0230	Q406			" " " "						
0231	Q407			" " " "						
0232	Q408			" " " "						
0233	Q409			" " " "						
0234	Q410			" " " "						
0235	Q411			" " " "						
0236	CR401	20	774-808195	RECTIFIER, METALLIC, FULL-WAVE BRIDGE	RADIO REC	C44S1B1G1GM8	1	1	7.40	7.40
0237	T401	20	792-403278	TRANSISTOR, STEP-DOWN	BECKMAN	792-403278	1	1	24.00	24.00
0238	L401	20	795-406287	CHOKE, FILTER, 50 MILLIHENRIES	BECKMAN	795-406287	1	1	13.50	13.50
0239		62-	855-401590	INDICATOR ASSEMBLY	BECKMAN	855-401590	4	0	110.00	
				EACH INDICATOR ASSEMBLY CONSISTS, OF ONE EACH, OF THE FOLLOWING REFERENCE DESIGANTIONS.						
	R202 R204 R206 R208 R210 R212 R214	20	601-000897	RESISTOR, FIXED, COMP, 2.2K, 1/2W, 5%	ALLEN BRD	EB2225	28	4	.20	.80
	R236 thru R244 and R253			SAME AS ITEM 0010						
	R252	20	601-008129	RESISTOR, FIXED, COMP, 1.5K, 1/2W, 5%	ALLEN BRD	EB1525	4	2	.20	.40
	R248 and R250			SAME AS ITEM 0042						
	R215 thru R221 and R249			SAME AS ITEM 0053						

SPARE PARTS LIST

RECOMMENDED SPARES FOR 2000 HRS OPERATION

EQUIPMENT 5924-4
CAT. NO.
LOT

ITEM NO.	REFERENCE DESIGNATION	INV.	BECKMAN INST. PART NO.	ITEM NAME AND DESCRIPTION	A TYPICAL MFR. & NO.		QTY./ EQUIP.	REC. SPARES	UNIT PRICE	EXTENDED PRICE
	R229 thru R235			SAME AS ITEM 0058						
	R201 R203 R205 R207 R209 R211 R213 R245 R247 R251			SAME AS ITEM 0065						
	R261	20	601-015460	RESISTOR, FIXED, COMP, 3.3K, 1/2W, 5%	ALLEN BRD	EB3325	4	2	.20	.40
	R222 thru R228			SAME AS ITEM 0102						
	R254 thru R260	20	601-800006	RESISTOR, FIXED, COMP, 27 OHMS, 1/2W, 5%	ALLEN BRD	EB2705	28	4	.25	1.00
	R246	20	601-800055	RESISTOR, FIXED, COMP, 470 OHMS, 1W, 5%	ALLEN BRD	GB4715	4	2	.30	.60
	C201 thru C214			SAME AS ITEM 0133						
	C215 thru C218			SAME AS ITEM 0139						
	C220			SAME AS ITEM 0166						
	C219	20	639-812420	CAPACITOR, FIXED, PAPER, .03MFD, 200V	ASTRON	ML-2-03	4	2	.50	1.00
	Q201 thru Q218			SAME AS ITEM 0180						
	CR201 thru CR207			SAME AS ITEM 0213						
	I201 thru I207	20	825-029726	LAMP, INCANDESCENT,	GEN ELECT	327	28	8	.60	4.80

INSTRUCTION MANUAL

MODEL 5920 SERIES
IN-LINE READOUT

Serial_____

NOTE

If model number is followed by one or more letters, the instrument covered by this manual has been modified. See section on modifications.

Beckman/ Berkeley Division
Richmond 3, California

February 1960

WARRANTY

Instruments sold by Berkeley Division, Beckman Instruments, Inc., (hereafter called "the Company") are warranted only as stated below.

Subject to the exceptions and upon the conditions specified below, the Company agrees to correct, either by repair, or, at its election, by replacement, any defect of material or workmanship which develops within one year after delivery of the instrument to the original purchaser by the Company or by an authorized representative, provided that investigation and factory inspection by the Company discloses that such defect developed under normal and proper use.

The exceptions and conditions mentioned above are the following:

(a) Some components and accessories by their nature are not intended to, and will not, function one year. If any such component or accessory manufactured by the Company and part of the item sold fails to give reasonable service for a reasonable period of time, the Company will, at its election, replace or repair such component or accessory. What constitutes reasonable service and what constitutes a reasonable period of time shall be determined solely by the Company after the Company is in posession of all the facts concerning operating conditions and other pertinent factors and after such component or accessory has been returned to the Company, transportation prepaid.

(b) All instruments claimed defective must be returned to the Company, transportation charges prepaid, and will be returned to the customer with the transportation charges collect, unless the item is found to be defective in which case the Company will pay all transportation charges.

(c) The Company makes no warranty concerning components or accessories not manufactured by it, such as tubes, fuses, batteries, etc. However, in the event of the failure of any component or accessory not manufactured by the Company, the Company will give reasonable assistance to the purchaser in obtaining from the respective manufacturer whatever adjustment is reasonable in the light of the manufacturer's own warranty.

(d) Except as stated above, the Company makes no warranty, express or implied (either in fact or by operation of law), statutory or otherwise; and, except to the extent stated above, the Company shall have no liability under any warranty, express or implied (either in fact or by operation of law), statutory or otherwise.

(e) The Company expressly disclaims any liability to its customers, dealers, and to users of its products, and to any other person or persons for consequential damages of any kind and from any cause whatsoever arising out of or in any way connected with the manufacture, sale, repair, replacement of, or arising out of or in any way connected with the use of any of its products.

(f) Representations and warranties made by any person, including representatives of the Company, which are inconsistent or in conflict with the terms of this warranty (including but not limited to the limitation of the liability of the Company as set forth above) shall not be binding upon the Company unless reduced to writing and approved by an officer of the Company.

(g) This warranty shall be governed by the laws of the State of California.

Claims for damage in shipment should be filed promptly with the transportation company.

All correspondence concerning the instrument should specify the model and serial number. This information appears on the company name plate. Any inquiry concerning details of operation, possible modifications, etc., should be addressed to the Sales Department, Berkeley division of Beckman Instruments, Inc., Richmond 4, California.

REPAIR SERVICE

Experienced service personnel and special test equipment are available at the factory to perform any necessary repairs. Every effort will be made to expedite the repair of instruments returned for servicing. Repair work will be performed only upon receipt of a written purchase order or authorization. Instruments to be repaired should be addressed to SERVICE AND REPAIR DEPARTMENT with transportation charges prepaid. Repaired instruments will be returned to the purchaser with transportation charges collect.

Berkeley reserves the right to make changes in design at any time without incurring any obligation to modify equipment previously purchased to conform to subsequent design changes.

BERKELEY DIVISION
BECKMAN INSTRUMENTS, INC.

MANUAL REVISION

Please check serial number prefix on nameplate of instrument to see which of these changes apply.

MODEL 5920

Serial Prefix

Please note the following changes:

11-

Change R201, R203, R205, R207, R209, R211, and R213 to 10K, 1/2W, 5%

Change R229 through R235 to 3.9K, 1/2W, 5%

Change R215 through R221 to 8.2K, 1/2W, 5%

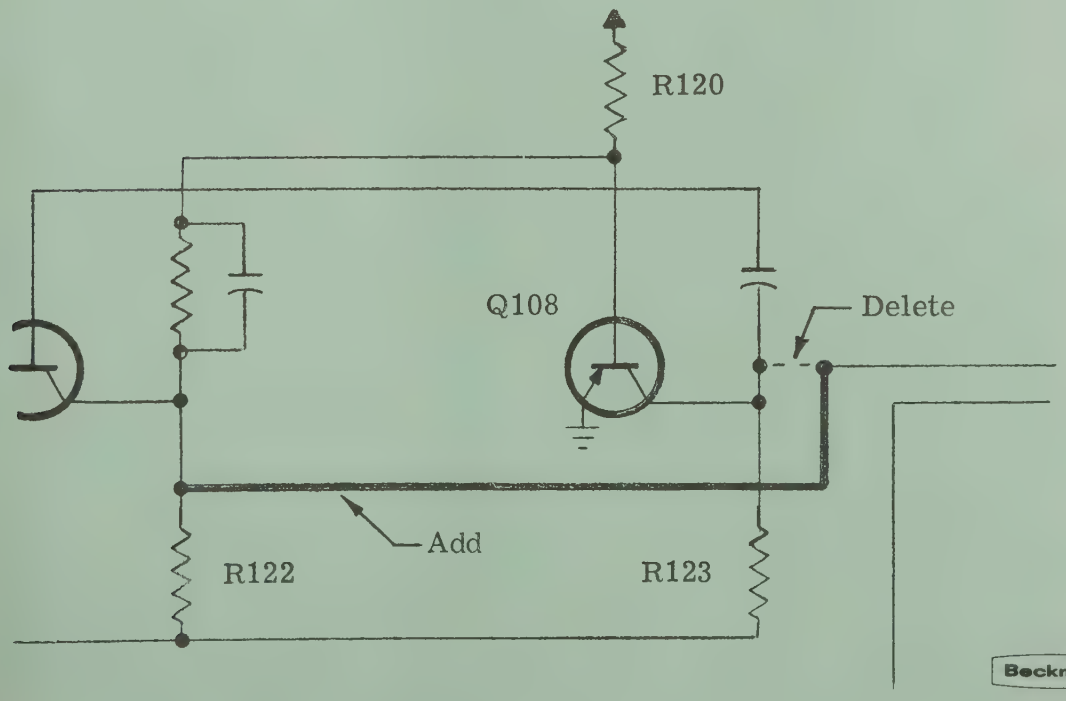
Change choke L401 to 50 millihenry. (Stock No. 406287)

Add capacitor C402, 2500μf, 25 v dc, (Stock No. 802934) in parallel with existing C401, and with same polarity.

Change tolerance of all resistors to 5% unless otherwise noted.

Change capacitor, C133 to 1μf, 200 v dc, metalized paper (Stock No. 006773).

Change Converter Unit 1-2-2-4 and Converter Unit 1-2-4-8 schematic diagrams as shown: (11-61)



Beckman

Serial Prefix	
11-	On Model 5927 Master Schematic Diagram, change detail number of .005μf capacitor at junction of R130 and CR126 from C133 to C141. On the Control Unit Schematic Diagram, show capacitor C301 with its negative side towards R301. (11-61)

CONTENTS

Page

1. INTRODUCTION
   - 1.1 General Description 1
   - 1.2 Technical Characteristics 1

2. OPERATION
   - 2.1 Preparing for Operation 3
   - 2.2 Description of the Operating Modes 3

3. SERVICING
   - 3.1 Replacing Indicator Lamps 5

MODIFICATIONS

DIAGRAMS

Model 5924 Master Schematic Diagram, Dwg. No. 5924 D 1
Model 5925 Master Schematic Diagram, Dwg. No. 5925 D 1
Model 5926 Master Schematic Diagram, Dwg. No. 5926 D 1
Model 5927 Master Schematic Diagram, Dwg. No. 5927 D 1
Converter Unit (1-2-2-4) Schematic Diagram, Dwg. No. 5920 D 1
Converter Unit (1-2-4-8) Schematic Diagram, Dwg. No. 5920 D 200
Control Unit Schematic Diagram, Dwg. No. 5920 C 3
Indicator Unit Schematic Diagram, Dwg. No. 5920 C 2
Power Supply Schematic Diagram, Dwg. No. 5920 E 4

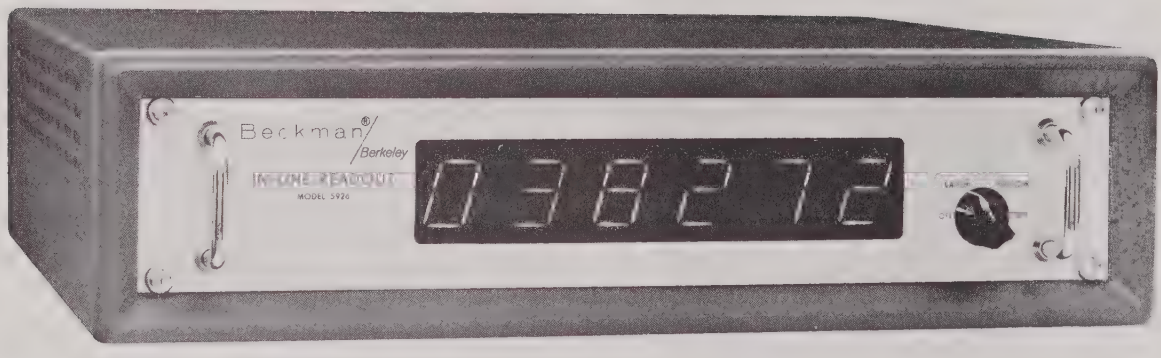


Fig. 1. The 5926 provides a six digit, in-line display of electronic counter readings. Other models in this series are the same except for the number of digits displayed.

1. INTRODUCTION

1.1 GENERAL DESCRIPTION

The 5920 series In-line Readout is an auxiliary unit which displays the readings of an electronic counter in large decimal digits arranged on a single horizontal line. The Readout receives its information from the counter in the form of binary-coded output signals. It then converts these signals into an illuminated display consisting of bright-red digits 1 - 1/4 inches high, appearing against a dark background and lying in the same vertical plane. Displayed numbers are therefore easy to read both under intense ambient light, and over a wide viewing angle.

The 5920 Readout has three operating modes: Latch, Follow, and Test. In the Latch mode, the unit displays only the count registered at the end of each counting period. In the Follow mode, on the other hand, the unit continually samples the counter output at a fixed rapid rate and displays the count registered at each sampling. The Test mode provides a means of determining whether all indicators are functioning correctly.

The 5920 series includes four basic models which differ only in the maximum number of digits displayed. The last digit in the model number indicates how many digits the unit can display. Although this unit is designed to operate with Beckman/ Berkeley counters, it can be used with any instrument which generates a four-place binary readout code for each decimal digit.

The 5920 series Readout is made up entirely of solid state components and can be operated inside its cabinet or mounted in a standard 19 inch relay rack.

1.2 TECHNICAL CHARACTERISTICS

Type of Display

In-line, in-plane, with illuminated bright red numerals 1 - 1/4 inches high against dark background.

Display Capacity

Model 5924:	4 digits
Model 5925:	5 digits
Model 5926:	6 digits
Model 5927:	7 digits

Input Required

Each decimal digit requires a 1-2-2-4 binary code represented by four input voltage levels at ground potential or -13 volts minimum.

Operating Modes

Latch, Follow, and Test

Display Repetition Rate

15 per second maximum

Ambient Temperature Limits

0 to 55 deg. C.

Power Required

45 watts at 117 v. AC (±10%), 50 to 60 cps

Dimensions

With cabinet: 20 - 3/4 inches wide, 5 - 1/2 inches high, 17 inches deep
Without cabinet: 19 inches wide, 3 - 1/2 inches high, 17 inches deep

2. OPERATION

2.1 PREPARING FOR OPERATION

The Readout unit is ready for use as soon as it is unpacked from its shipping container and inspected for damage in transit. The unit can be operated inside its cabinet or mounted in a standard 19 inch relay rack.

Ordinarily, the Readout should have the same digit display capacity as the counter with which it is used. If the counter used displays fewer digits than the Readout unit, the Readout indicators in the unused digit positions will display unintelligible information. Each unused indicator, in such a case, can be disabled by disconnecting the E- line supplying its lamps.

CAUTION

In disabling the indicator lamps, care should be taken not to disconnect the gate control circuit from the B- supply line.

To put the unit into operation, proceed as follows:

1) Connect the power cord to a 117 volt, 50-60 cps source.

2) Plug the 40-pin cable connector from the Readout into the DIGITAL RECORDER socket at the rear of the counter. (Note: If the Readout is being used with an instrument other than a Beckman/Berkeley counter, see the schematic diagram for the correct input connections.)

3) Turn the selector switch on the front panel of the Readout to TEST. If the unit displays the figure "8" in each digit position, all indicators are functioning properly, and the Readout can be put into operation by turning the selector switch to LATCH or FOLLOW, depending on the operating mode wanted.

2.2 DESCRIPTION OF THE OPERATING MODES

2.2.1 The FOLLOW Function

In this mode of operation, the Readout unit continually samples the coded output signals from the counter at a fixed rate of about 15 per second, and

displays the count registered at the time of each sampling. Thus, while the counter is scaling, the Readout unit tends to follow the changing count, with the display changing at a maximum rate of 15 times a second.

2.2.2 The LATCH Function

In this mode, the Readout unit samples the coded output from the counter only when the counter sends out a control signal; this happens at the end of each counting period. Consequently, the Readout unit displays only the count registered at the end of a counting period and maintains this display until the end of the next counting period. If the registered count at that time is the same as that of the previous period, there will be no visible interruption of the display on the Readout unit. Thus, if it is necessary to record manually the registered count at the end of each counting period, the FOLLOW mode may be the more convenient one to use.

2.2.3 The TEST Function

In this mode, the unit generates a set of internal signals which illuminates all display elements in each digit indicator. If all the indicators are working properly, the unit displays the figure "8" in every digit position. Conversely, any digit indicator which does not display an "8" is faulty.

3. SERVICING

3.1 REPLACING INDICATOR LAMPS

The 5920 series Readout uses aircraft type indicator lamps designed to have a long operating life and to withstand vibration and shock. If it does become necessary to replace a lamp in one of the indicator assemblies, proceed as follows:

1) Remove the two screws (one on top, one on bottom) which hold the indicator assembly to the chassis and lift the indicator clear of the front panel. Be careful not to yank the connecting leads.

2) Unfasten the lamp block from the front of the indicator assembly, taking care to keep the back of the block pointed upward.

3) Slip the burned out lamp out of the back of the lamp block and replace with a new one.

4) Fasten the lamp block to the front of the indicator assembly, making sure the block is rightside up (the round hole in the front of the block should be in the lower right-hand corner).

5) Carefully push the indicator assembly back into place and fasten to the chassis.

MODIFICATIONS

MODIFICATION H

With this modification, the unit is supplied with the power transformer (T401) wired to operate from a 220 volt, 50-60 cps AC source (see power supply schematic). Note that the line fuses (F401, F402) are rated at 1/2 a. for 220 volt operation.

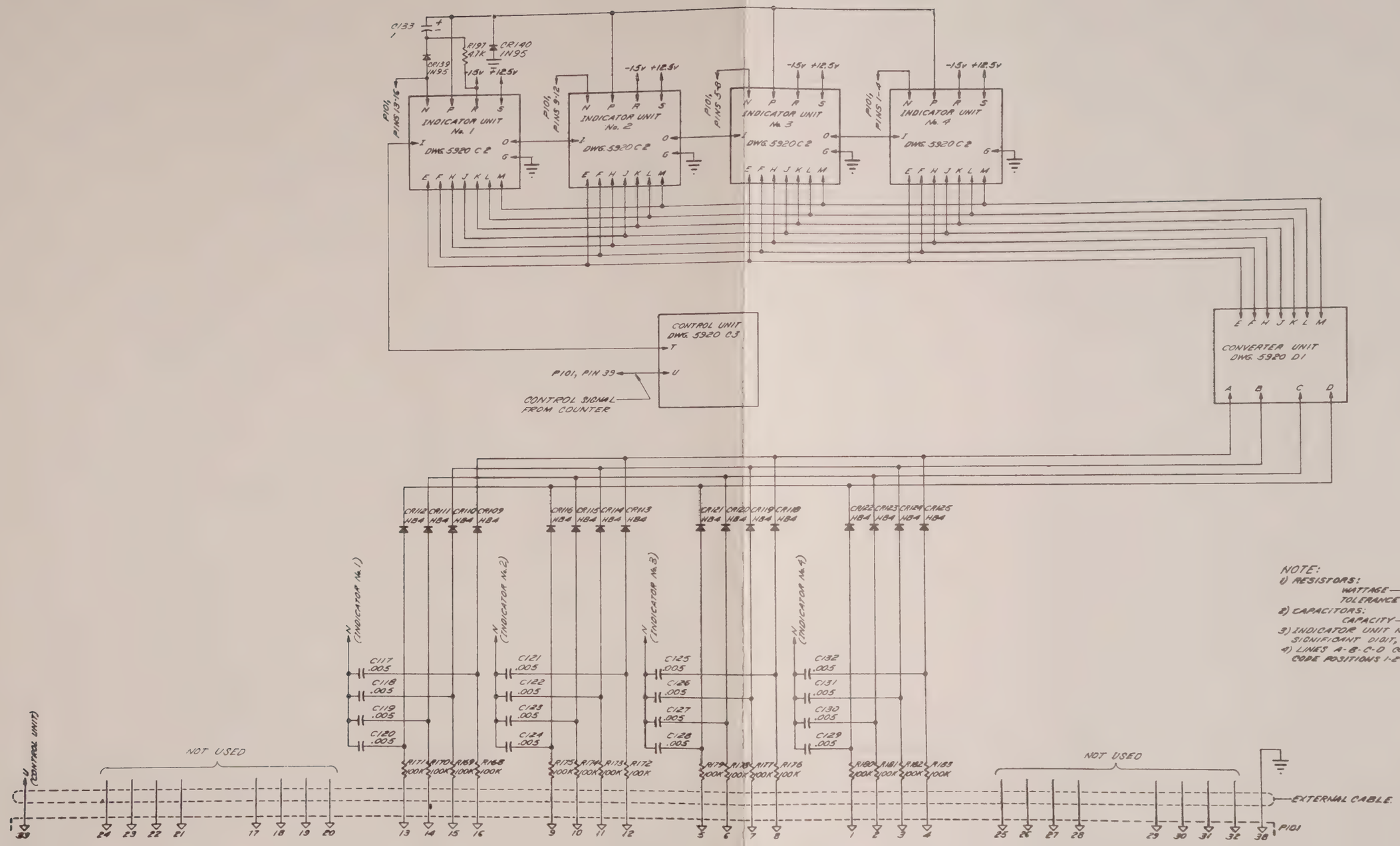
MODIFICATION R

In this modification, the instrument is supplied with a chassis cover instead of a cabinet. The unit can thus be mounted in a standard 19 inch rack.

MODIFICATION T

In this modification, the converter unit has been changed so that the instrument will operate with a 1-2-4-8 binary code input. See drawing 5920 D 200.

MODEL 5924, MASTER
SCHEMATIC DIAGRAM

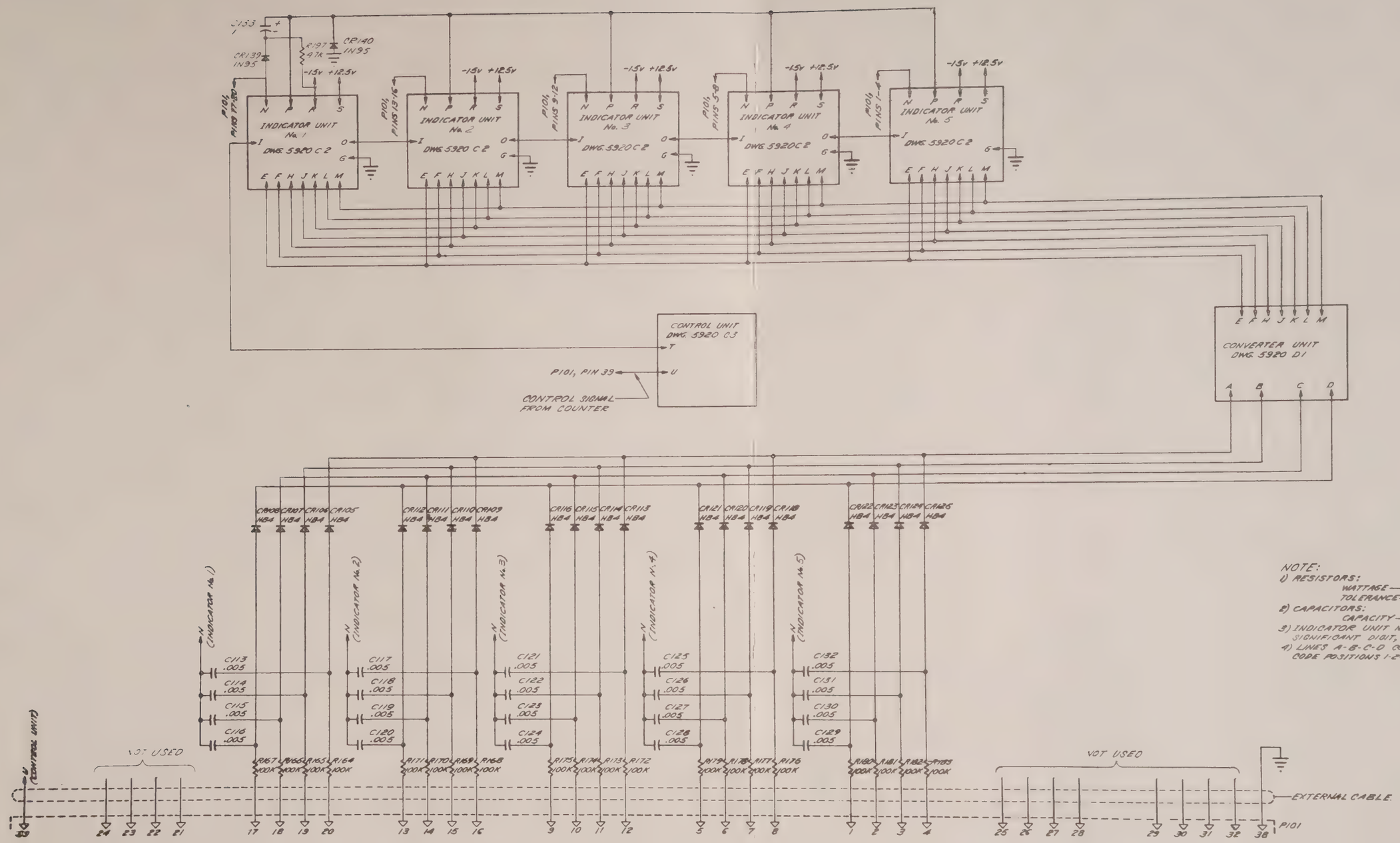


NOTE:
1) RESISTORS:
WATTAGE — ½ W EXCEPT AS NOTED.
TOLERANCE — 10% " " " .
2) CAPACITORS:
CAPACITY — IN μf " " " .
3) INDICATOR UNIT No. 1 DISPLAYS THE LEAST SIGNIFICANT DIGIT, No. 2 THE NEXT, ETC,.
4) LINES A-B-C-D CORRESPOND TO BINARY CODE POSITIONS 1-2-2-4 (OR 1-2-4-8) RESPECTIVELY.

May 1960

BECKMAN/BERKELEY DIVISION
DWG. NO. 5924 D 1

MODEL 5925, MASTER
SCHEMATIC DIAGRAM

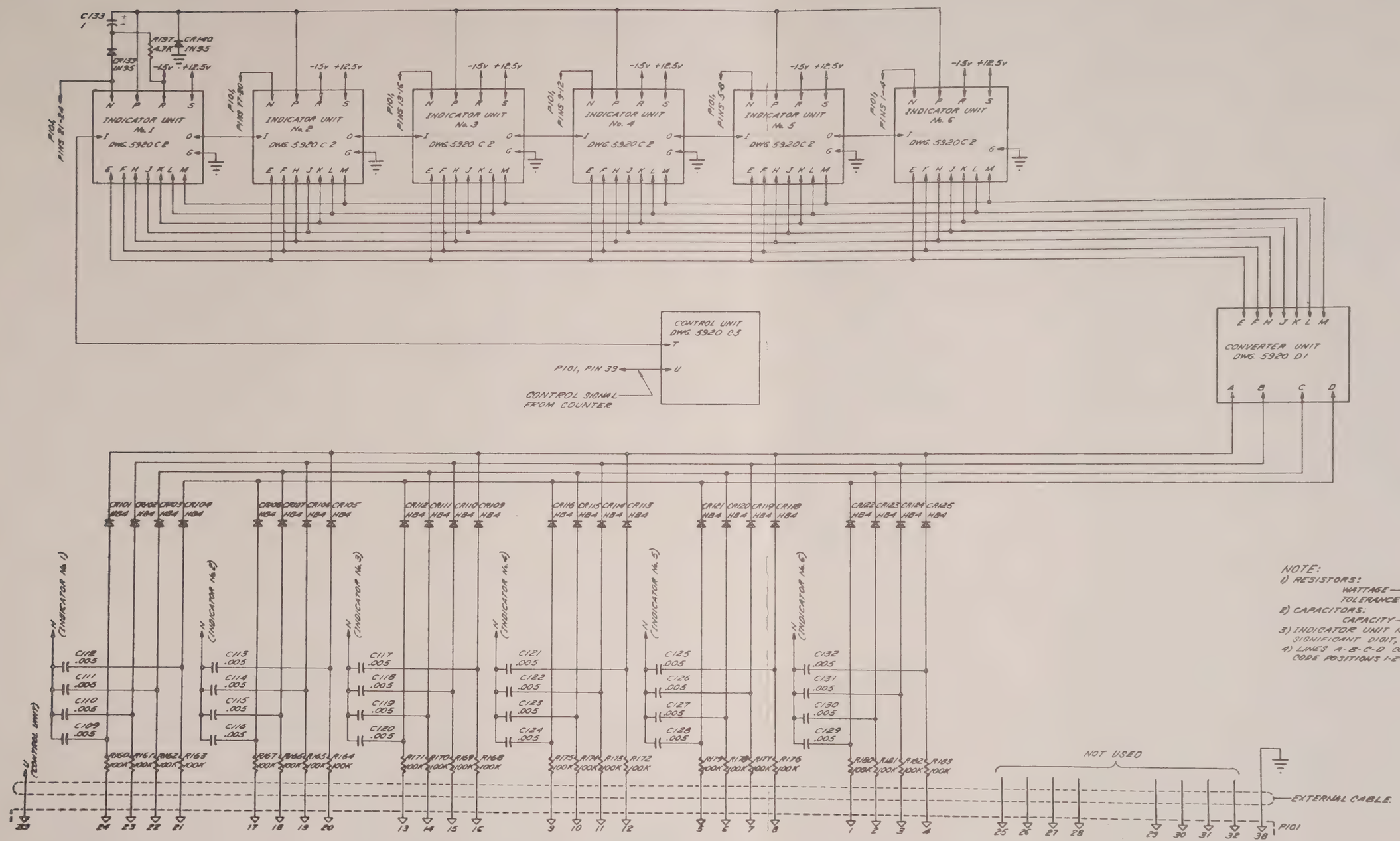


NOTE:
1) RESISTORS:
WATTAGE — ½W EXCEPT AS NOTED.
TOLERANCE — 10% " " " .
2) CAPACITORS:
CAPACITY — IN µf " " " .
3) INDICATOR UNIT No. 1 DISPLAYS THE LEAST SIGNIFICANT DIGIT, No. 2 THE NEXT, ETC.,.
4) LINES A-B-C-D CORRESPOND TO BINARY CODE POSITIONS 1-2-2-4 (OR 1-2-4-8) RESPECTIVELY.

May 1960

BECKMAN/ **BERKELEY** DIVISION
DWG. NO. **5925 D 1**

MODEL 5926, MASTER
SCHEMATIC DIAGRAM

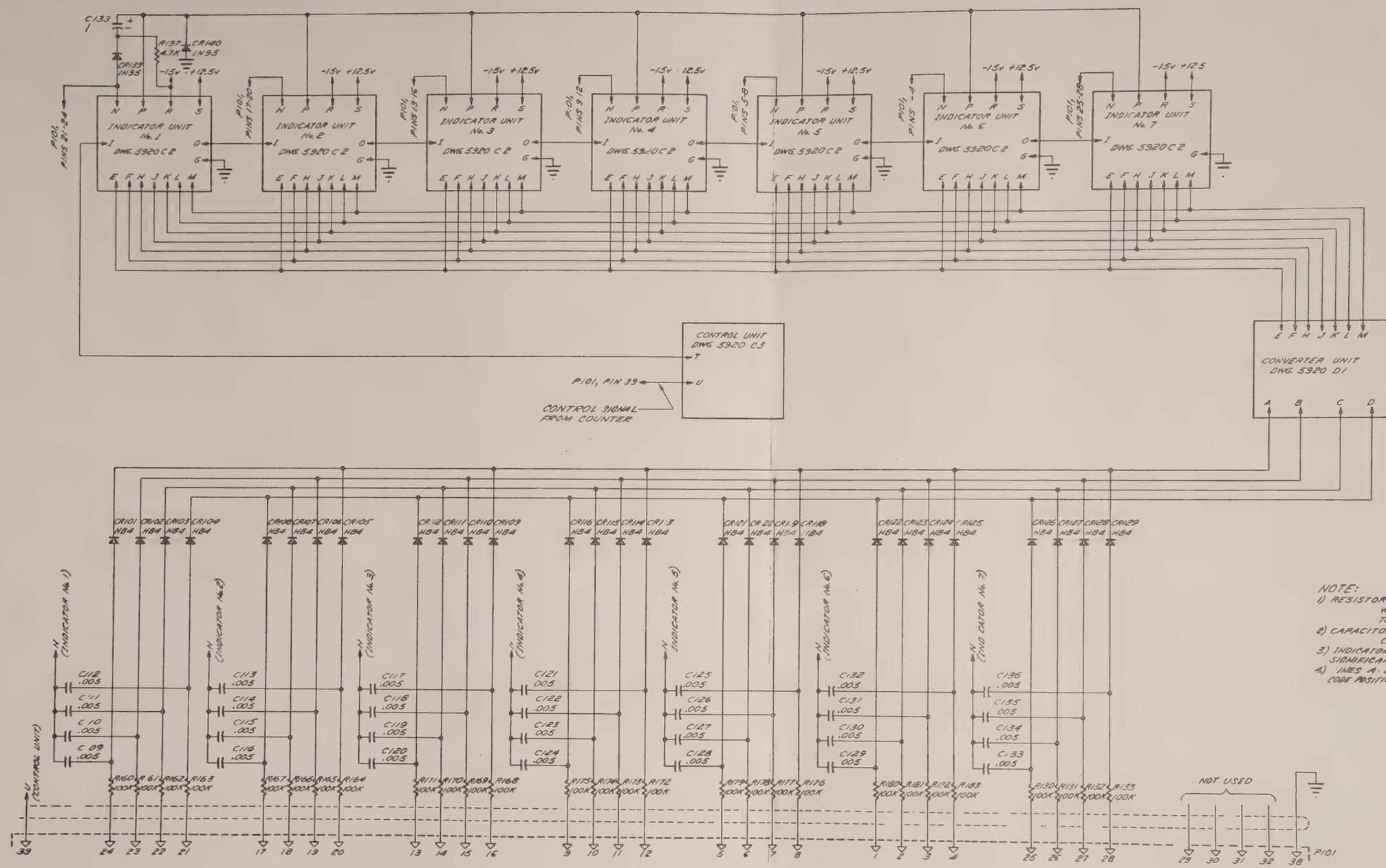


NOTE:
1) RESISTORS:
WATTAGE — ½ W EXCEPT AS NOTED.
TOLERANCE — 10% " " " .
2) CAPACITORS:
CAPACITY — .01 μf " " " .
3) INDICATOR UNIT No. 1 DISPLAYS THE LEAST SIGNIFICANT DIGIT, No. 2 THE NEXT, ETC.
4) LINES A-B-C-D CORRESPOND TO BINARY CODE POSITIONS 1-2-4-8 (OR 1, 2, 4, 8) RESPECTIVELY.

May 1960

BECKMAN/ BERKELEY DIVISION
DWG. NO. 5926 D 1

MODEL 5927, MASTER SCHEMATIC DIAGRAM

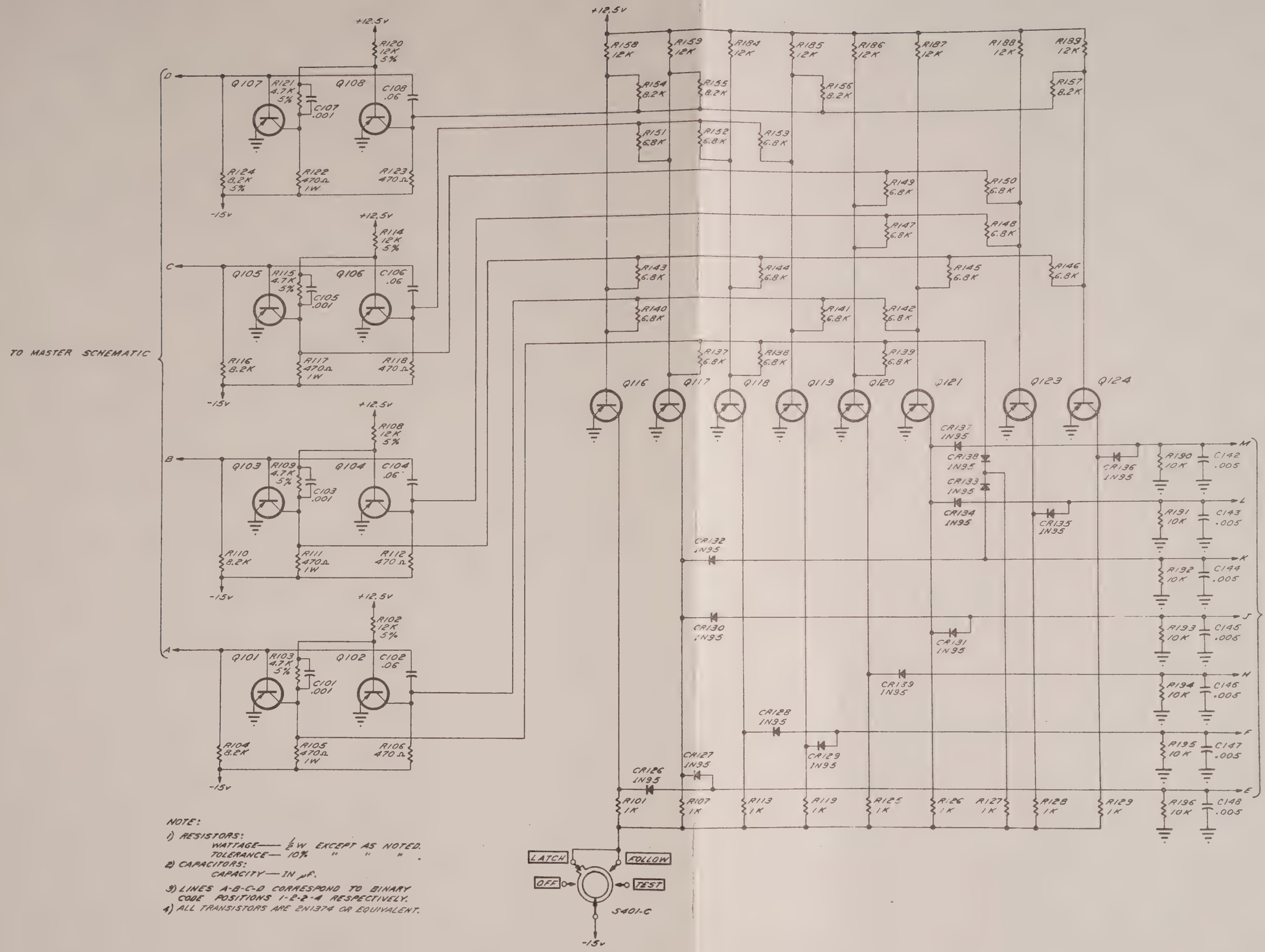


NOTE:
1) RESISTORS:
WATTAGE — ½W EXCEPT AS NOTED.
TOLERANCE — 1% " " " .
2) CAPACITORS:
CAPACITY — IN μF .1 " " " .
3) INDICATOR UNIT No. 1 DISPLAYS THE LEAST SIGNIFICANT DIGIT, No 2 THE NEXT ETC.
4) LINES A-B-C-D CORRESPOND TO BINARY CODE POSITIONS 1-2-2-4 (OR 1-2-4-8) RESPECTIVELY.

May 1960

BECKMAN/ BERKELEY DIVISION
DWG. NO 5927 D 1

CONVERTER UNIT, 1-2-2-4
SCHEMATIC DIAGRAM



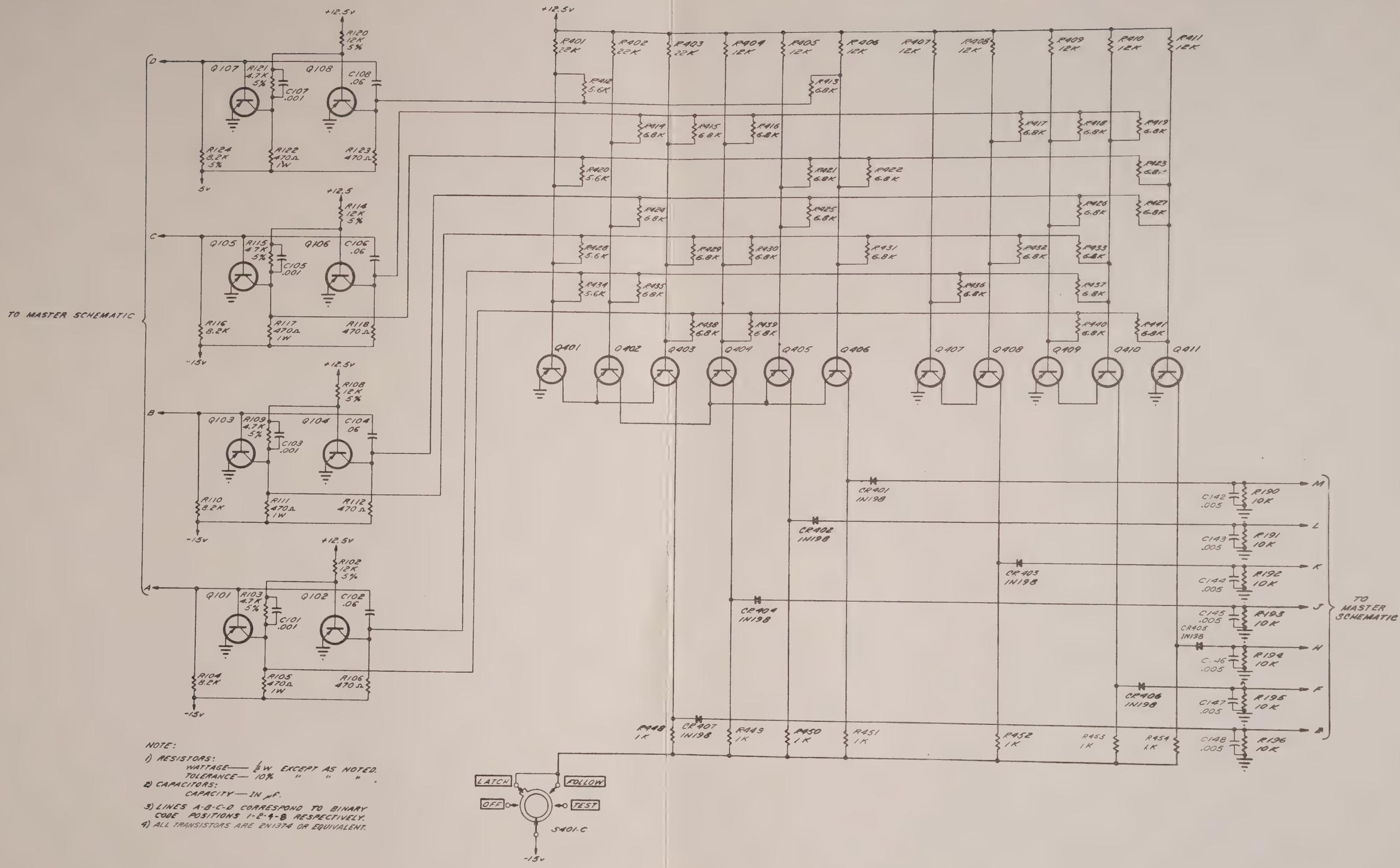
NOTE:

1) RESISTORS:
   WATTAGE—— ½ W. EXCEPT AS NOTED.
   TOLERANCE— 10% " " " .
2) CAPACITORS:
   CAPACITY— IN μF.
3) LINES A-B-C-D CORRESPOND TO BINARY CODE POSITIONS 1-2-2-4 RESPECTIVELY.
4) ALL TRANSISTORS ARE 2N1374 OR EQUIVALENT.

March 1961

BECKMAN/ BERKELEY DIVISION
DWG. NO. 5920 D 1

CONVERTER UNIT, 1-2-4-8
SCHEMATIC DIAGRAM



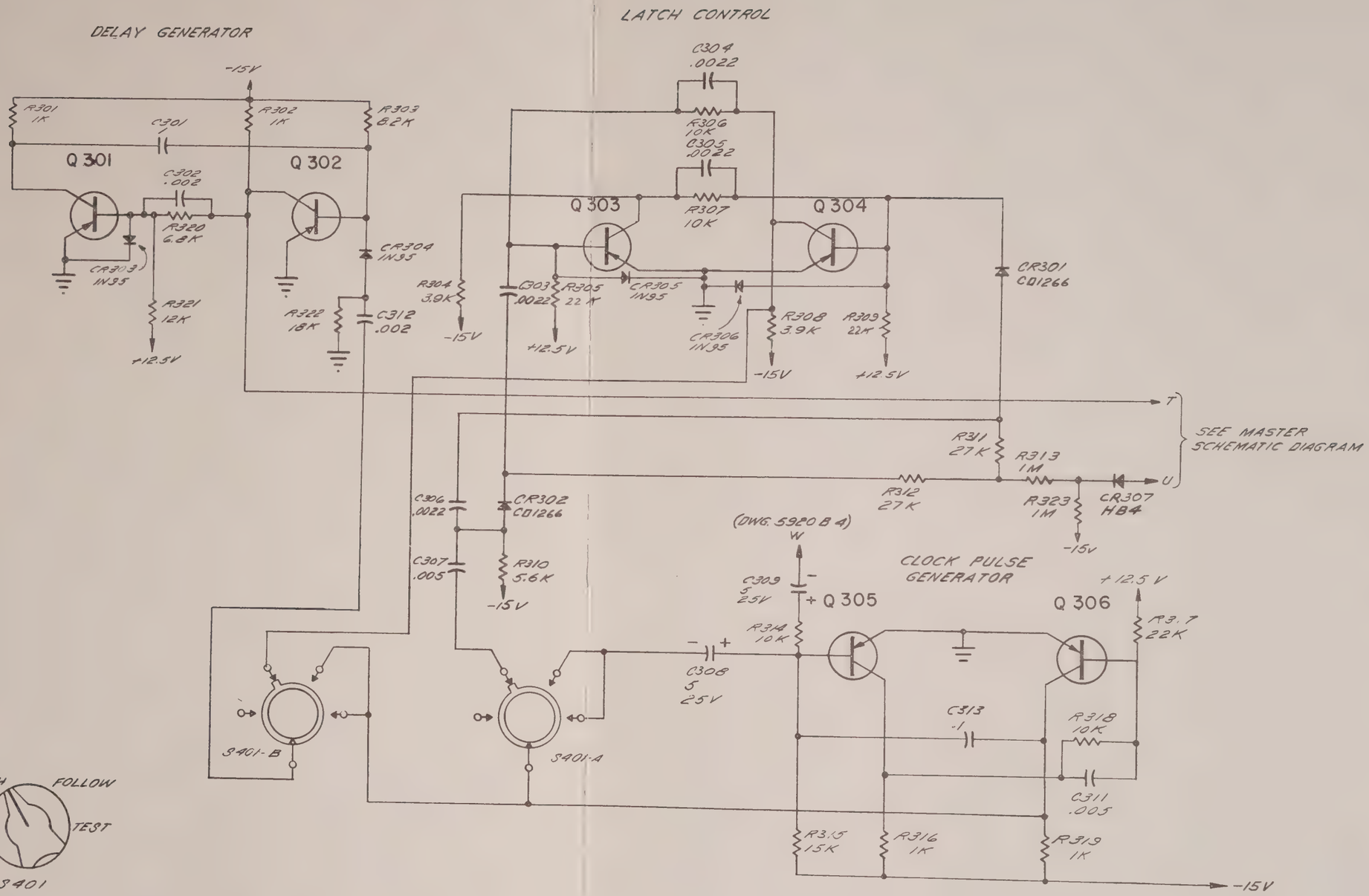
NOTE:

1) RESISTORS:
   WATTAGE — ½ W EXCEPT AS NOTED.
   TOLERANCE — 10% " " " .
2) CAPACITORS:
   CAPACITY — IN μF.
3) LINES A-B-C-D CORRESPOND TO BINARY CODE POSITIONS 1-2-4-8 RESPECTIVELY.
4) ALL TRANSISTORS ARE 2N1374 OR EQUIVALENT.

March 1961

BECKMAN/ BERKELEY DIVISION
DWG. NO. 5920 D 200

CONTROL UNIT
SCHEMATIC DIAGRAM



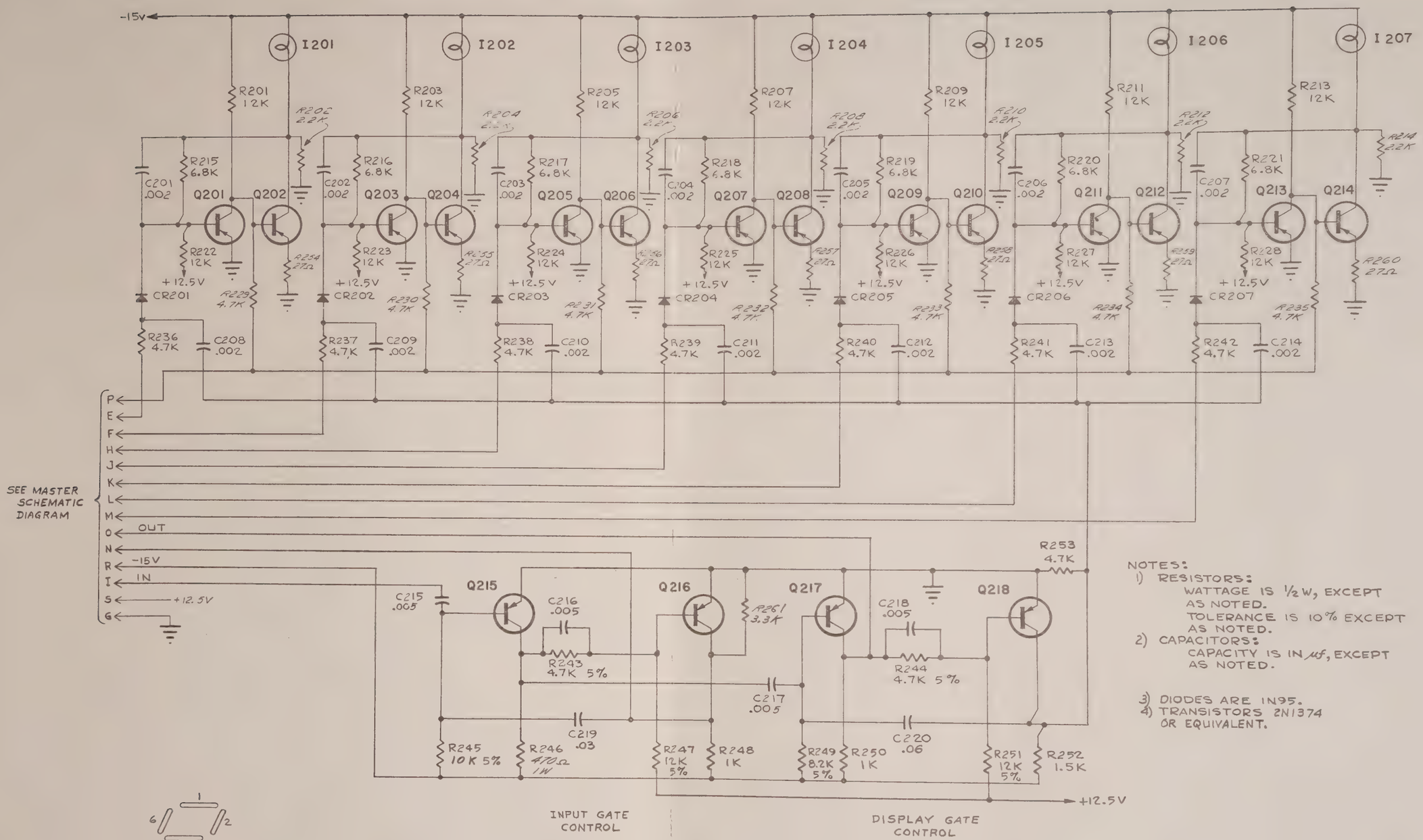
S401
(SWITCH SHOWN IN LATCH POSITION)

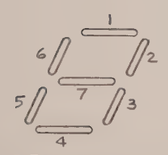
NOTE:
1) RESISTORS:
WATTAGE —— ½W UNLESS OTHERWISE NOTED.
TOLERANCE —— 10 % " " "
2) CAPACITORS:
CAPACITY —— IN μf UNLESS OTHERWISE NOTED.
3) ALL TRANSISTORS ARE 2N1374 OR EQUIVALENT.

March 1961

BECKMAN/ BERKELEY DIVISION
DWG. NO. 5920 C 3

INDICATOR UNIT
SCHEMATIC DIAGRAM





SEGMENTED INDICATING LAMPS I 201 THRU I 207

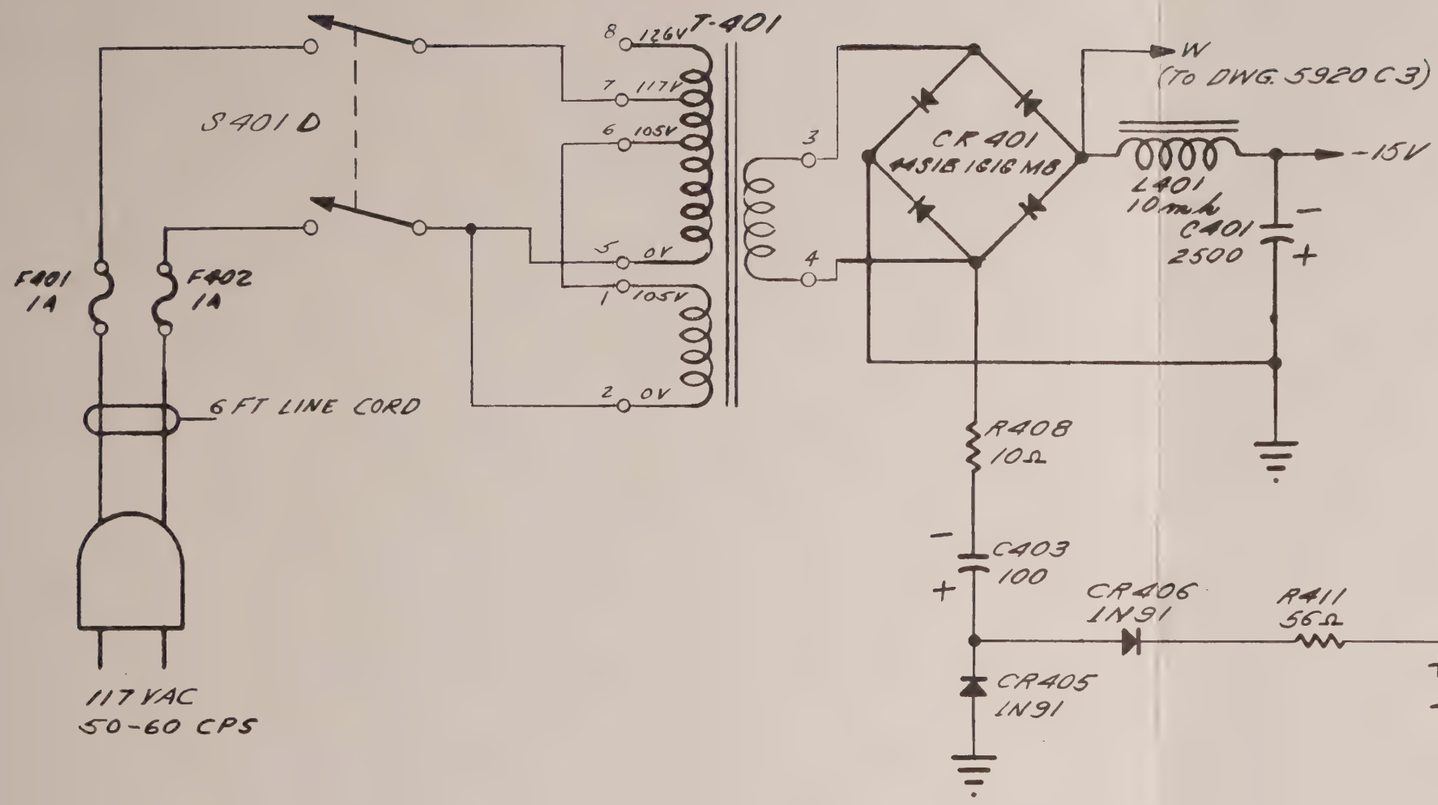
NOTES:

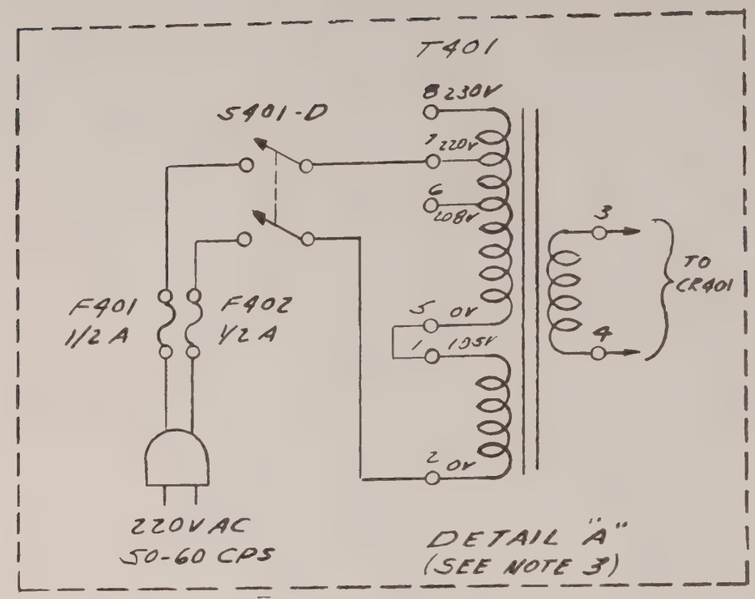
1) RESISTORS:
   WATTAGE IS ½ W, EXCEPT AS NOTED.
   TOLERANCE IS 10% EXCEPT AS NOTED.
2) CAPACITORS:
   CAPACITY IS IN μf, EXCEPT AS NOTED.
3) DIODES ARE IN95.
4) TRANSISTORS 2N1374 OR EQUIVALENT.

May 1960

BECKMAN/ BERKELEY DIVISION
DWG. NO. 5920 C 2

POWER SUPPLY SCHEMATIC DIAGRAM

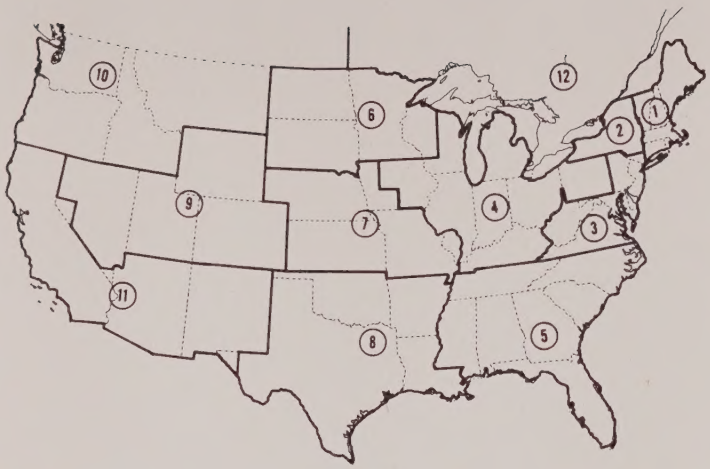




NOTES:
1) RESISTORS:
   WATTAGE —— ½W UNLESS OTHERWISE NOTED.
   TOLERANCE —— 10 % " " "
2) CAPACITORS:
   CAPACITY —— IN μf UNLESS OTHERWISE NOTED.
3) FOR 220V AC OPERATION, REWIRE T401 & CHANGE FUSE AS SHOWN IN DETAIL "A"

February 1960

BECKMAN/BERKELEY DIVISION
DWG. NO. 5920 B 4



"Instrumental In Your Future"

BECKMAN/BERKELEY REPRESENTATIVES

1 BROGER INSTRUMENT SALES COMPANY, INC.

Boston Area
48 Pearl Street
Brookline 47, Massachusetts
Phone: BEacon 2-4804

New Haven 15, Connecticut
31 Broadway
P. O. Box 2917
Phone: SPruce 7-6279

2 SBM ASSOCIATES, INC.

Rochester 10, New York
177 Winton Road, North
Phone: OLympic 4-8440

Utica, New York
232 Roosevelt Drive
Phone: REdwood 2-4410

Binghamton, New York
Nowlan Road, R.D. No. 3
Phone: RAymond 2-2648

Syracuse, New York
1943 West Fayette Street
Phone: HOward 8-5041

3 GAWLER-KNOOP COMPANY

New York City Area
178 Eagle Rock Avenue
Roseland, New Jersey
Phone: CAldwell 6-4545
DIgby 4-2997 (N. Y. C.)

Washington, D. C. Area
8732 Flower Avenue
Silver Spring, Maryland
Phone: JUniper 5-7550

Philadelphia Area
835 Glenside Avenue
Wyncote, Pennsylvania
Phone: WAverly 7-1820

Baltimore Area
807 East Seminary Avenue
Towson 4, Maryland
Phone: ENterprise 9-3151

INTERNATIONAL SALES EXCEPT CANADA:

Beckman Instruments International, S.A.,
Geneva, Switzerland

Beckman Instruments, GmbH, Munich, Germany

Beckman Instruments, Ltd., Glenrothes, Scotland

4 RIDGWAY ASSOCIATES

Chicago 39, Illinois
6100 West North Avenue
Phone: TUxedo 9-5715

Indianapolis 2, Indiana
1224 North Capitol Avenue
Phone: MElrose 5-2401

Cleveland 31, Ohio
5917 Schaaf Road
Phone: LAfayette 4-1421

Dayton 32, Ohio
3898 Linden Avenue
Room 209 Arcade
Phone: CLearwater 2-5604

Detroit Area
3384 West Twelve Mile Rd.,
Berkley, Michigan
Phone: LIncoln 6-3312

5 MURPHY AND COTA

Atlanta 9, Georgia
2110 Peachtree Road, N.W.
Phone: TRinity 6-3020

Orlando, Florida
2319 E. South St.
Phone: GArden 4-2167

Winston-Salem, North Carolina
1106 Burke Street
Phone: PArk 4-0750

Huntsville, Alabama
Room 216
Electric Systems Center
Phone: JEfferson 9-8476

6 PINKNEY & HINE COMPANY

Minneapolis 3, Minnesota
1925 Nicollet Avenue
Phone: FEderal 8-0523

7 LEEMARK ASSOCIATES

Kansas City 15, Missouri
4021 West 86th Street
Phone: NIagara 2-3313

St. Louis 17, Missouri
2001 Big Bend Boulevard
Phone: MIssion 7-1470

8 DANNEMILLER-SMITH, INC.

Dallas 35, Texas
2712 West Mockingbird Lane
Phone: FLeetwood 7-8249

Houston 27, Texas
6218-B Westheimer Road
Phone: SUnset 2-7350

9 WILLIAMS & ASSOCIATES, INC.

Denver 22, Colorado
2261-63 South Albion Street
Phone: SKyline 6-9403

Salt Lake City, Utah
362 Pierpont Ave.
Phone: 328-3101

10 RUSH S. DRAKE ASSOCIATES, INC.

Seattle 44, Washington
1817 South Norman Street
Phone EAst 3-8545

Idaho Falls, Idaho
P. O. Box 2126
Phone: JAckson 2-7992

11 V. T. RUPP COMPANY

Los Angeles 26, California
307 Parkman Avenue
Phone: DUnkirk 7-8224

Albuquerque, New Mexico
1437 San Mateo, N.E.
Phone: 256-0798

San Diego 3, California
3445 - 5th Avenue
Phone: CYpress 8-9835

San Francisco Area
1182 Los Altos Avenue
Los Altos, California
Phone: 948-1483

12 R-O-R ASSOCIATES, LIMITED

Toronto, Ontario
1470 Don Mills Road
Don Mills, Ontario
Phone HIckory 4-4429

Montreal, Quebec
3333 Cavendish Boulevard
Phone: HUnter 1-0700

Ottawa 3, Ontario
864 Lady Ellen Place
Phone: PArkway 9-1585

MP MASTER
MA31724